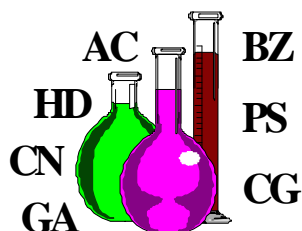


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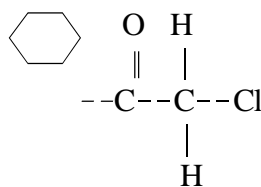


*Detailed Facts About Tear Agent  
Chloracetophenone  
in Benzene and Carbon Tetrachloride  
(CNB)*

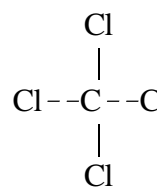
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*Physical Properties of Tearing Agent Chloroacetophenone  
in Benzene and Carbon Tetrachloride*

**Chemical Structure**



chloroacetophenone (CN)  
(10 parts)



carbon tetrachloride (45 parts)



benzene (45 parts)

**Chemical Formula**

Chloroacetophenone (CN) -  $C_6H_5COCH_2Cl$   
(10 parts by weight)

Carbon Tetrachloride -  $CCl_4$   
(45 parts by weight)

Benzene -  $C_6H_6$   
(45 parts by weight)

**Description**

CNB is a slightly brown liquid smelling heavily of benzene. It has an immediate strong irritating effect on the eyes and respiratory tract. CNB is flammable.

**Molecular Weight**

119.7

**Freezing Point**

-7°C to -30°C

**Agent CNB** - The chemical mixture of chloroacetophenone in benzene and carbon tetrachloride. The Chemical Abstract Service Registry Number is not available.

<b>Density</b>	Liquid = 1.14 g/cc @ 20°C Vapor = approximately 4 (air = 1)	
<b>Solubility</b>	No data available	
<b>Flash Point</b>	Below 4.47°C; one of the main reasons CNB ceased to be used by police agencies.	
<b>Volatility</b>	Benzene -	320,624 mg/m <sup>3</sup> @ 20°C 420,111 mg/m <sup>3</sup> @ 25°C
	Carbon Tetrachloride-	766,000 mg/m <sup>3</sup> @ 20°C
<b>Toxicity Values</b>	IC <sub>50</sub>	= 80 mg-min/m <sup>3</sup>
	LC <sub>50</sub>	= 11,000 mg-min/m <sup>3</sup> (about the same as CN)

### ***Exposure Limits***

#### Alpha-Chloroacetophenone (CN)

Workplace Time-Weighted Average -	3 mg/m <sup>3</sup>
General Population Limits -	0.32 mg/m <sup>3</sup>

#### Benzene

Workplace Time-Weighted Average -	1 ppm
General Population Limits -	32 mg/m <sup>3</sup>

#### Carbon tetrachloride

Workplace Time-Weighted Average -	2 mg/m <sup>3</sup>
General Population Limits -	31 mg/m <sup>3</sup>

## ***Toxic Properties of Tear Agent Chloroacetophenone in Benzene and Carbon Tetrachloride***

*CNB was adopted in 1920 and remained in use until it was replaced by Chloroacetophenone and Chloropicrin in Chloroform. The advantages claimed for CNB was that its lower chloroacetophenone content made it more satisfactory than chloroacetophenone in chloroform (CNC) for training purposes.*

### ***Overexposure Effects***

CNB is a formulation of chloroacetophenone. Like CN, CNB has a pronounced lacrimatory effect, resulting in a natural reflex to shut the eyes. It is similarly irritating to the skin, especially

the face and such exposed portions of the body where sweat accumulates. CNB will penetrate clothing or adhere to it under long exposure due to its benzene component. The same rashes caused by CN will be caused by CNB. CNB has a slightly more powerful choking effect than CN. Eye toxicity remains about the same as CN. Some sensitive individuals may experience

nausea upon exposure. CNB can form lethal concentrations in closed or confined spaces, although concentrations in open areas are highly unlikely ever to do so.

### ***Emergency and First Aid Procedures***

Inhalation: remove the victim to fresh air immediately; perform artificial respiration if breathing has stopped; keep victim warm and at rest; seek medical attention immediately.

Eye Contact: wash eyes immediately with copious amounts of water, lifting the lower and upper lids occasionally; do not wear contact lenses when working with this chemical; seek medical attention immediately.

Skin Contact: wash the contaminated skin with soap or mild detergent and water immediately; remove the contaminated clothing immediately; wash the skin using soap or mild detergent and water; seek medical attention immediately when there are chemical burns or evidence of skin irritation.

Ingestion: induce vomiting by having victim touch the back of his throat with finger or by giving victim syrup of ipecac as directed; do not induce vomiting if victim is unconscious; seek medical attention immediately.

Decontamination: None needed in the field; wash contaminated surfaces with a 5 percent solution by weight of sodium hydroxide in 95 percent alcohol or with a mixture of 20 parts water and 80 parts carbitol (diethylene glycol).

### ***Protective Equipment***

Protective Gloves: Wear impervious gloves.

Eye Protection: Wear dust- and splash-proof safety goggles where there is any possibility of solid CNB or liquids containing CNB contacting the eyes; use appropriate protective mask.

Other: Wear a complete set of protective clothing to include gloves and lab coat, apron, boots, plastic coveralls; other protective clothing and equipment should be available to prevent contact with skin or clothing; remove contaminated clothing immediately; do not wear clothing until it has been properly laundered.

### ***Reactivity Data***

Stability: Adequate in storage.

Hydrolysis Rate: None.

Hydrolysis Products: None.

Corrosive Properties: Very slight action on metals or other materials.

**Persistency** Short.

### ***References***

1. Code of Federal Regulations, Part 1910.1000, Title 29 (29 CFR 1910.1000), *Air Contaminants*, 1994.
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3. Department of the Army Technical Manual (DA TM) 3-250, *Storage, Shipment, Handling, and Disposal of Chemical Agents and Hazardous Chemicals*, 1969.
4. *The Merck Index, An Encyclopedia of Chemicals, Drugs, and Biologicals, Eleventh Edition*, Merck & Co., Inc., Rahway, New Jersey, 1989.
5. *Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices for 1995-1996*, American Conference of Governmental Industrial Hygienists (ACGIH), Cincinnati, Ohio.
6. U.S. Army Chemical Command Materiel Destruction Agency, *Site Monitoring Concept Study*, 15 September 1993.

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